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SUMMARIES OF RESEARCH, FISCAL YEAR 1978.(U)
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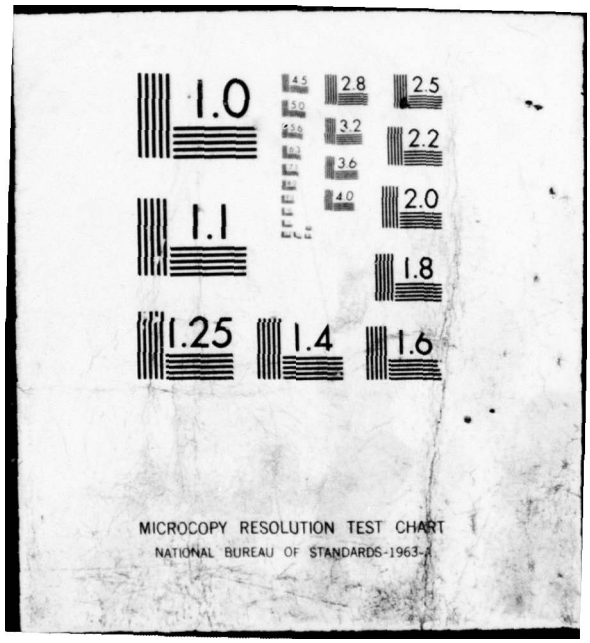
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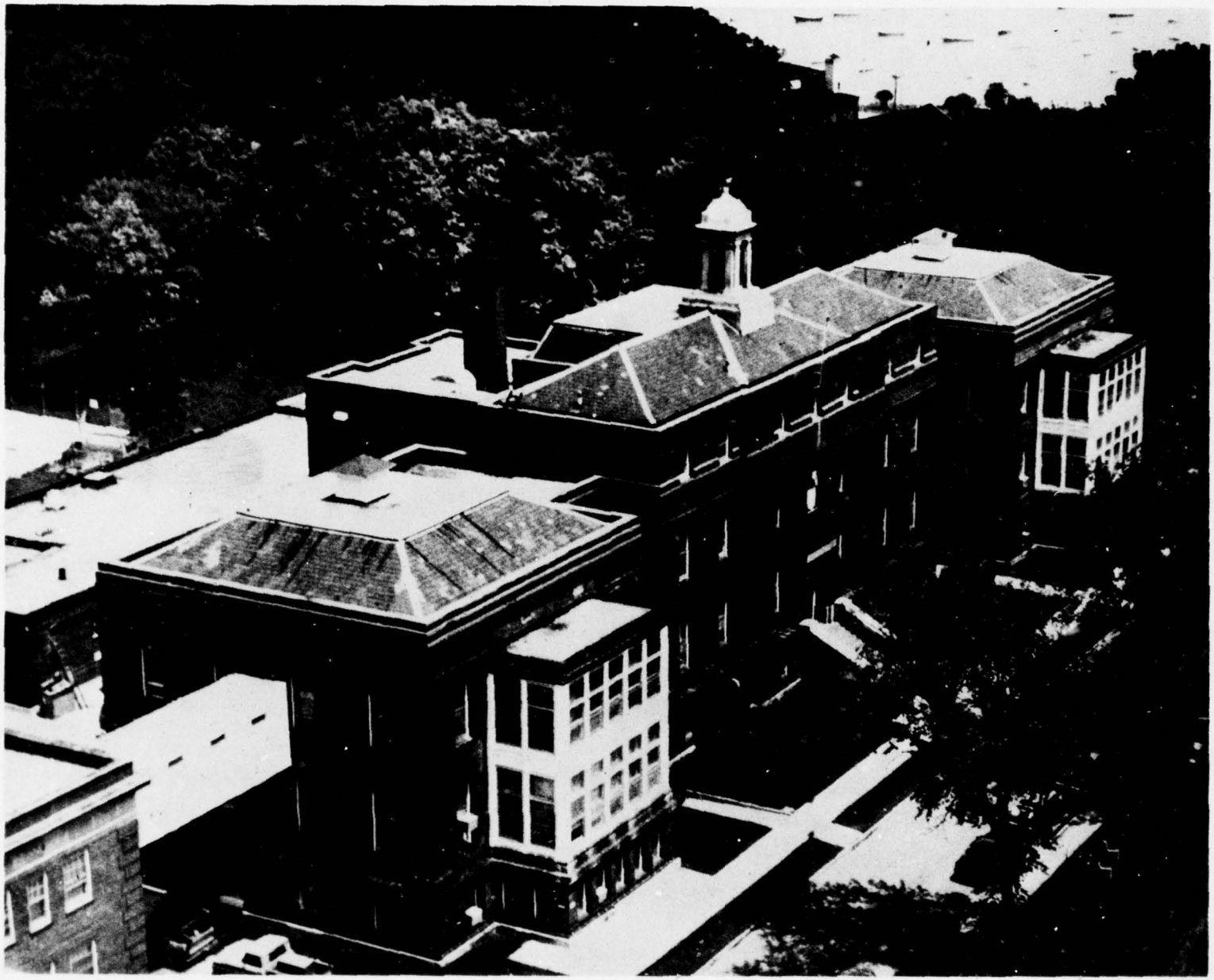
(16) # SUMMARIES OF RESEARCH,

Fiscal Year 1978.

NAVAL
DENTAL RESEARCH
INSTITUTE

Naval Medical Research and Development Command
Bethesda, Maryland



NAVAL DENTAL RESEARCH INSTITUTE
NAVAL BASE, BLDG. 1-H
GREAT LAKES, ILLINOIS 60088

SUMMARIES OF RESEARCH
Fiscal Year 1978

These summaries cover research carried out from 01 October 1977 through 30 September 1978.

Approved and released by:

M. R. WIRTHLIN, JR.
Captain, DC, USN
Commanding Officer

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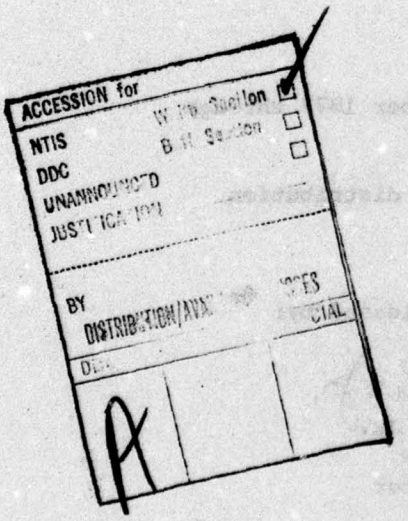
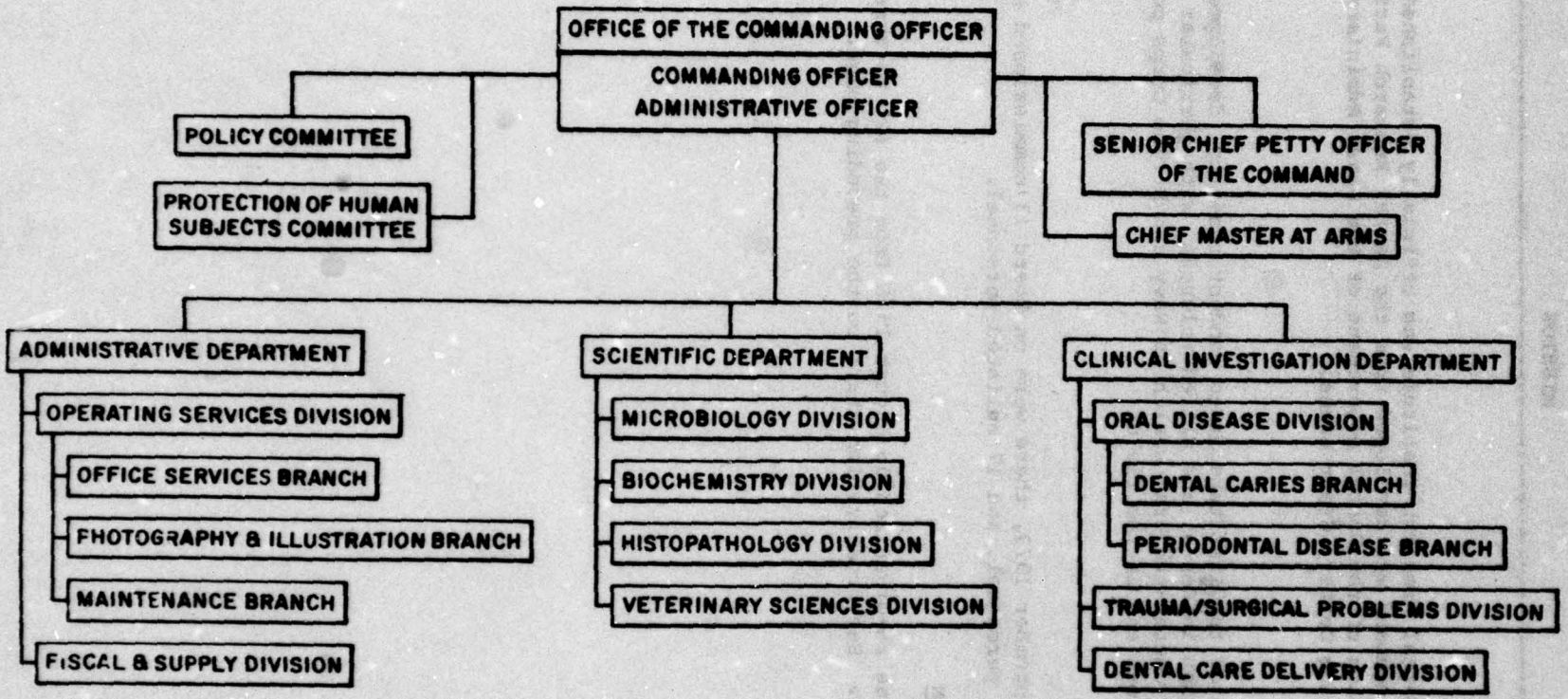


NAVAL DENTAL RESEARCH INSTITUTE



DATE _____ APPROVED: _____
MILTON R WIRTHLIN JR, CAPTAIN, DC, USN

TITLE OF PARENT ORGANIZATION: NMRDC
TITLE OF FIELD ACTIVITY: NAVAL DENTAL RESEARCH INSTITUTE

MISSION

COMMAND

The Naval Dental Research Institute was officially established 01 January 1967. The command was developed from the Dental Research Facility, which was a Division of the Dental Department of the Naval Administrative Command, Naval Training Center, Great Lakes.

MISSION

The mission of the Institute is to conduct research, development, test and evaluation in dental and allied sciences, with particular emphasis on problems of dental and oral health in Navy and Marine Corps populations ashore, afloat and in the field.

PERSONNEL

As of 30 September 1978, there were on board 13 commissioned officers, 13 civilian personnel, and 17 enlisted personnel.

ORGANIZATION

The Institute re-organized 05 August 1976 from two (2) to three (3) Departments. See organization chart on the preceding page.

FORMAL PRESENTATIONS OF RESEARCH MADE AT MEETINGS OF SCIENTIFIC SOCIETIES RESULTS REPORTED AND/OR DISCUSSIONS LED

OCTOBER

LEONARD, E. P. presented "The TLOM/Ndri Strain of Rat: Characteristics and Potential for Use in Research," to the Chicago Section of the American Association for Dental Research.

NOVEMBER

WIRTHLIN, M. R. presented "The Role of Preventive Dentistry in the Navy," to the Association of Military Surgeons of the United States, Washington, D. C.

MARCH

The International Association for Dental Research meeting held in Washington, D.C. was attended by the following staff personnel:

CLARK, G. E. presented "Quantitative Evaluation of the Effect of Dental Pulp Irritants in Rabbit Skin and on Cultured Cells."

GALICH, J. W. presented "The Treatment of Deep Carious Lesions in Naval Recruits."

HANCOCK, E. B. presented "Histologic Assessment of Periodontal Probes in Normal Gingiva."

LAMBERTS, B. L. presented "Glucanase Producing Organisms in Dental Plaque of Caries-Free and Caries-Active Naval Recruits."

LEONARD, E. P. presented "The Effect of 2% Chlorhexidine Gluconate Application on Plaque and Alveolar Bone Loss in the Rat."

MANDEL, E. J. presented "An Evaluation of Indices in the Classification of Naval Recruits into High and Low Risk Caries Groups."

SHKLAIR, I. L. presented "*S. mutans* Glucan Production and Caries Activity in Rats."

SIMONSON, L. G. (Chairman of Microbiology VI - Chemistry Session I) presented "Comparison of Some Dextranase Preparations for Prevention of Dental Caries and Plaque in Hamsters."

WALTER, R. G. presented "A 20 Year Comparison of Disease Experience and Treatment Requirements in Naval Recruits."

WIRTHLIN, M. R. presented "Clinical, Epidemiological, and Behavioral Profiles of Young Adult Males with Necrotizing Gingivitis."

YEAGER, J. E. presented "Tooth Transplantation in RhLA Type Monkeys - 18 Month Post-operative Findings."

FORMAL PRESENTATIONS OF RESEARCH MADE AT MEETINGS OF SCIENTIFIC SOCIETIES RESULTS REPORTED AND/OR DISCUSSIONS LED (Continued)

APRIL

SIMONSON, L. G. presented "T and B-RFC Inhibiting Factor in Plasma from Patients with Active Hodgkins Disease," Abstract #64, at the annual meeting of the American Association for Cancer Research.

MAY

GAINES, J. F. presented "Animal Dental Models" and "Simplified Techniques for Extraction of Canine Teeth from Macaques," at the Operational Lab Animal Medicine Problems Course, USAFSAM Brooks AFB, Texas.

WIRTHLIN, M. R. presented "Technology Transfer from Navy to Civilians" at the Chicago Section of the American Association for Dental Research.

The Naval Medical Research and Development Command and Office of Naval Research Conference on Oral and Dental Health Research was attended by the following personnel:

ANDERSON, D. M. and CLARK, G. E. presented "Evaluation of Expedient Procedures for Treating Dental Pulp Disease in Naval Personnel."

GALICH, J. W. presented "Clinical Evaluation of Methods for Detection and Treatment of Incipient Carious Lesions in Naval Recruits."

GAUGLER, R. W. presented "Evaluation of Fluoride Concentration in Plaque of Naval Recruits."

HANCOCK, E. B. presented "Wound Healing of the Supporting Tissues of the Teeth of Naval Personnel."

LAMBERTS, B. L. presented "Evaluation of Oral Factors in Decay-Free Naval Recruits to Develop New Preventive Measures."

LEONARD, E. P. presented "Evaluation of Therapeutics for the Prevention of Oral Bone Destruction in Navy and Marine Corps Personnel."

MUELLER, E. J. presented "Isolation of Anaerobic Microorganisms from Naval Personnel with Acute Periodontal Disease."

SHKLAIR, I. L. presented papers on "Microbiology of Oral Diseases of Significance to Naval Personnel" and "Evaluation of Anti-Microbial Agents on Disease Producing Organisms of the Oral Cavities of Naval Recruits."

SIMONSON, L. G. presented "Evaluation of Methods to Degrade Components of Dental Plaque Associated with Oral Diseases of Naval Personnel."

FORMAL PRESENTATIONS OR RESEARCH MADE AT MEETINGS OF SCIENTIFIC SOCIETIES RESULTS REPORTED AND/OR DISCUSSIONS LED (Continued)

May (Continued)

WALTER, R. G. presented "The Prevention of Tooth Destruction by Low Molecular Weight Dextrans."

WIRTHLIN, M. R. presented "Evaluation of Naval Oral Health Problems."

YEAGER, J. E. presented "Evaluation of Dental Implants as Applied to Navy and Marine Corps Personnel."

SEPTEMBER

PECOTTE, J. K. presented "Chemistry of *Actinomyces viscosus* in Periodontal Disease," at a table clinic held at the Greater Milwaukee Dental Association.

CLARK, G. E. and GAUGLER, R. W. presented "Investigations of the Naval Dental Research Institute," at a table clinic held at the Greater Milwaukee Dental Society Annual Meeting in Milwaukee, Wisconsin.

PARTICIPATION IN OTHER PROGRAMS

OCTOBER

A meeting of the Chicago Chapter of the American Association for Dental Research was attended by the following staff personnel:

ANDERSON, D. M.
GAUGLER, R. W.
LAMBERTS, B. L.
LEONARD, E. P.
SHKLAIR, I. L.
SIMONSON, L. G.
WIRTHLIN, M. R.

The annual meeting of the American Academy of Periodontology held in Boston, Massachusetts, was attended by:

HANCOCK, E. B.
WIRTHLIN, M. R.

ELLIOTT, G. R. attended Health Care Council at the Naval Regional Medical Center at Great Lakes.

GAINES, J. F. attended the annual meeting of the American Association for Laboratory Animal Sciences at Anaheim, California.

NOVEMBER

A meeting of the Chicago Chapter of the American Association for Dental Research was attended by the following staff personnel:

ANDERSON, D. M.
GAUGLER, R. W.
LAMBERTS, B. L.
LEONARD, E. P.
SHKLAIR, I. L.
SIMONSON, L. G.
WIRTHLIN, M. R.
YEAGER, J. E.

GALICH, J. W. attended University of Michigan Symposium, "Incipient Caries of Enamel."

ROUSE, M. J., CFC representative for NDRI, attended a CFC luncheon meeting.

PARTICIPATION IN OTHER PROGRAMS (Continued)

DECEMBER

The Great Lakes Dental Society meeting held in Libertyville, Illinois, was attended by the following personnel:

ANDERSON, D. M.
CLARK, G. E.
GALICH, J. W.
HANCOCK, E. B.
WIRTHLIN, M. R.

JANUARY

A meeting for the Chicago Chapter of the American Association for Dental Research was attended by the following staff personnel:

ANDERSON, D. M.
CLARK, G. E.
GAUGLER, R. W.
HANCOCK, E. B.
LAMBERTS, B. L.
LEONARD, E. P.
SHKLAIR, I. L.
SIMONSON, L. G.
WIRTHLIN, M. R.

FEBRUARY

The Mid-Winter meeting of the Chicago Dental Society was attended by the following staff personnel:

ANDERSON, D. M.
GALICH, J. W.
HANCOCK, E. B.
LEONARD, E. P.
WIRTHLIN, M. R.

Naval Reserve Officer's Luncheon (in conjunction with the Chicago Dental Society meeting) was attended by:

ANDERSON, D. M.
LEONARD, E. P.
WIRTHLIN, M. R.

A meeting of the Great Lakes Dental Society was attended by:

ANDERSON, D. M.
CLARK, G. E.
GALICH, J. W.
HANCOCK, E. B.

PARTICIPATION IN OTHER PROGRAMS (Continued)

FEBRUARY (Continued)

The annual meeting of the Midwest Society of Periodontology was attended by:

HANCOCK, E. B.
WIRTHLIN, M. R.

SIMONSON, L. G. attended the Lake County Cancer Society meeting.

LAMBERTS, B. L. attended the meeting of Officers of the Chicago Section of the International Association for Dental Research to plan future section activities.

The command observed Children's Dental Health Week by inviting dependent children to a tour of NDRI and a dental examination.

Captain M. R. Wirthlin explaining the importance of good oral hygiene to a patient during Children's Dental Health Week

PARTICIPATION IN OTHER PROGRAMS (Continued)

MARCH

HANCOCK, E. B. attended a meeting on Evaluation of Graduate Research Protocols, at Indiana University, Indianapolis.

SIMONSON, L. G. attended "Practical Management of Esophageal Carcinoma" at Chicago Medical School.

WIRTHLIN, M. R. met with Commanding Officer, Naval Health Research Center, San Diego to discuss research.

APRIL

ANDERSON, D. M. attended the annual meeting of the American Association of Endodontists in Las Vegas, Nevada.

MUELLER, E. J. attended Safety Officer Training presented by Naval Sea Systems Command Safety School, Bloomington, Indiana.

SIMONSON, L. G. attended Seminar "Comparing Chlorambucil and Prednisone vs Total Body Radio Therapy in Chronic Lymphocytic Leukema," Cancer Center, CMS - VA Hospital.

WIRTHLIN, M. R. attended the Commanding Officer's Conference, NMRDC, Bethesda, Maryland.

MAY

WIRTHLIN, M. R. met with Dr. D. Eisenmann of University of Illinois, Chicago.

WIRTHLIN, M. R. represented NDRI at the Chicago City Council and Mayor's Armed Forces Day ceremonies.

NDRI hosted the Chicago Section of the American Association for Dental Research for their monthly dinner meeting with speaker.

WIRTHLIN, M. R. represented NDRI at the Navy Medical Department Reception.

WIRTHLIN, M. R. attended the Great Lakes Dental Society meeting.

The American Society for Microbiology meetings held in Las Vegas, Nevada, were attended by the following personnel:

MUELLER, E. J.
SHKLAIR, I. L.
SIMONSON, L. G.

PARTICIPATION IN OTHER PROGRAMS (Continued)

JUNE

LAMBERTS, B. L. attended the American Society for Biological Chemists meeting held in Atlanta, Georgia.

WIRTHLIN, M. R. presented a seminar at NRDC on "NDRI Research Projects."

WIRTHLIN, M. R. attended the Midwest Society of Periodontology in Lincolnshire.

WIRTHLIN, M. R. met with Dr. J. Abramowitz at Marquette University, Milwaukee.

SHKLAIR, I. L. attended a meeting at the American Dental Association for critique and discussion of Professor Jackson's work on the genetic control of caries.

LAMBERTS, B. L. and SIMONSON, L. G. visited the Northern Regional Research Center (USDA) for research consultation in Peoria, Illinois.

JULY

Performance Evaluation meeting was attended by:

ANDERSON, D. M.
LAMBERTS, B. L.
SHKLAIR, I. L.
WIRTHLIN, M. R.

WIRTHLIN, M. R. attended a conference in Washington, D. C. area regarding requirements for engineering development of equipment for fleet and field oral and dental health care.

HANCOCK, E. B. attended Review of Graduate Research at Indiana University, Indianapolis.

SEPTEMBER

NELSON, L. D. attended "Safety and Health of Civilian Employees" meeting/seminar, and "Master Plan Update" at Great Lakes.

WIRTHLIN, M. R. and CECIL, J. C. attended the Preventive Dentistry Seminar in Washington, D. C.

WIRTHLIN, M. R. and HANCOCK, E. B. attended the American Academy of Periodontology annual meeting held in Phoenix, Arizona.

WORK UNITS - FISCAL YEAR 1978

63706N M0095-PN M0095-PN003 3008 - Evaluation of Expedient Procedures for Treating Dental Pulp Disease in Naval Personnel

63706N M0095-PN M0095-PN003 3010 - Wound Healing of the Supporting Tissues of the Teeth of Naval Personnel

63706N M0095-PN M0095-PN003 3011 - Evaluation of Dental Impalnts as Applied to Navy and Marine Corps Personnel

M0095 PN003 3016 - Navy Dental Technician Utilization

61153N MR04120 MR0412002 0408 - Evaluation of Therapeutic Agents for the Prevention of Oral Bone Destruction in Navy and Marine Corps Personnel

61153N MR04120 MR0412002 6049 - Microbiology of Oral Diseases of Significance to Naval Personnel

62758N F51524 ZF51524012 0002 - Evaluation of Antimicrobial Agents on Disease Producing Organisms of the Oral Cavity of Naval Recruits

62758N F51524 ZF51524012 0006 - Evaluation of Navy Oral Health Programs

62758N F51524 ZF51524012 0012 - Evaluation of Methods to Degrade Components of Dental Plaque Associatied with Oral Disease of Naval Personnel

62758N F51524 ZF51524012 0022 - Evaluation of Oral Factors in Decay-Free Naval Recruits to Develop New Preventive Measures

RESEARCH PROGRESS REPORTS - FY 1978

NDRI-PR 77-07 Summaries of Research, Fiscal Year 1977

NDRI-PR 77-08 Research Abstracts of 1977

OTHER PUBLICATIONS

BAHN, A. N., SHKLAIR, I. L., and HAYASHI, J. A. "Immunization with Dextransucrases, Levansucrases, and Glycosidic Hydrolases from Oral Streptococci. II. Immunization with Glucosyltransferases, Fructosyltransferases, and Glycosidic Hydrolases from Oral Streptococci in Monkeys." J. Dent. Res. 56:332, 1977.

COLSON, P., JARRELL, H. C., LAMBERTS, B. L., and SMITH, I. C. P. "Determination by Carbon-13 NMR of the Composition of Glucans Synthesized by Enzymes of the Cariogenic Organisms Streptococcus mutans." Carbohydrate Res. (in press).

COWMAN, R. A., SCHAEFER, S. J., FITZGERALD, R. J., ROSNER, D., SHKLAIR, I. L., and WALTER, R. G. "Utilization of Salivary Proteins in Saliva from Caries-Active versus Caries-Free Subjects as Nitrogen Sources by Plaque-Forming Oral Streptococci." Arch. Oral Biol. (in press).

LEONARD, E. P. "The TLOM/Ndri Rat: A New Model for the Study of Bone Metabolism." Proc. Inst. Med. Chicago 31:207, 1977.

LEONARD, E. P. and MANDEL, E. J. "Use of Chlorhexidine Gluconate to Prevent Bone Resorption in the Rice Rat." J. Dent. Res. (in press).

MEYER, T. S., LAMBERTS, B. L., and Egan, R. S. "Structural Studies of Extracellular Glucans of Streptococcus mutans by Proton Magnetic Resonance." Carbohydrate Res. 66:33, 1978.

WIRTHLIN, M. R. "The Role of Preventive Dentistry in the Navy." U. S. Navy Medicine 69:22, 1978.

WIRTHLIN, M. R. and DEVINE, L. "Venery and Vincent's? 15 Case Reports and Discussion." J. Periodontol. 49:449, 1978.

DISTINGUISHED VISITORS

OCTOBER

Captain J. F. Kelly, DC, USN; Head, Oral and Dental Health Division, Naval Medical Research & Development Command, Bethesda, Maryland
CDR D. L. Farnsworth, SC, USN; Commanding Officer, Naval Regional Finance Center, Great Lakes

NOVEMBER

Dr. K. Langeland, University of Connecticut, Farmington, Connecticut
P. J. Reinhard, A. B. Dick representative, Evanston, Illinois
Dr. G. Pelleu, Naval Graduate Dental School, Bethesda, Maryland
Dr. S. Mukherjee, University of Illinois, Chicago, Illinois
W. Hendrickson, University of Illinois, Center for Education Development
Dr. H. Loevy, University of Illinois, Chicago, Illinois

DECEMBER

Captain J. D. Bloom, MC, USN; Commanding Officer, Naval Medical Research and Development Command, Bethesda, Maryland
Captain J. F. Kelly, DC, USN; Head, Oral and Dental Health Division, Naval Medical Research and Development Command, Bethesda, Maryland

JANUARY

Dr. H. Shade, Northwestern University, Chicago, Illinois
Dr. D. Dunshee, GSA, Chicago, Illinois
LT P. F. Marischen, DC, USNR, Naval Regional Dental Center, Great Lakes

FEBRUARY

Rear Admiral P. E. Farrell, DC, USN; Assistant Chief for Dentistry, and Chief, Dental Division, Bureau of Medicine & Surgery, Washington, D. C.
Dr. M. J. Favus, Michael Reese Hospital, Chicago, Illinois
R. E. Minniak, AVICON, Schaumberg, Illinois

MARCH

Mr. P. Pipe, Consultant on Education, Sunnyvale, California
Dr. M. J. Favus, University of Chicago, Michael Reese Hospital, Chicago, Illinois
Dr. F. L. Coe, University of Chicago, Michael Reese Hospital, Chicago, Illinois

APRIL

Dr. K. Beultmann, Glenview, Illinois

DISTINGUISHED VISITORS (Continued)

MAY

Mr. C. Montagne, ONR Patent Counsel, Chicago, Illinois
Dr. P. Bricker, Loyola University, Chicago, Illinois
Dr. H. Wyckoff, American Dental Association, Chicago, Illinois
Dr. R. Bauer, American Dental Association, Chicago, Illinois
Dr. K. Hoerman, Loyola University, Chicago, Illinois

JUNE

Dr. C. Schoenfield, American Dental Association, Chicago, Illinois
CAPT J. R. Cooper, USAF, VC, Brooks AFB, San Antonio, Texas
CAPT R. Harvey, USAF, VC, Brooks AFB, San Antonio, Texas

JULY

Dr. H. R. Rawls, Louisiana State University, New Orleans, Louisiana
CAPT J. R. Cooper, USAF, VC, Brooks AFB, San Antonio, Texas

AUGUST

ENS L. J. Kitslaar, Marquette Dental School, Milwaukee, Wisconsin
ENS W. J. Clark, Marquette Dental School, Milwaukee, Wisconsin
ENS R. W. Koulsky, University of Minnesota Dental School, Minneapolis, Minnesota
ENS G. A. Hamburg, University of Detroit, Detroit, Michigan
ENS M. T. Hetzler, University of Minnesota Dental School, Minneapolis, Minnesota
ENS H. H. Fischer, Jr., Marquette Dental School, Milwaukee, Wisconsin
ENS J. D. Hillin, University of S.E. Missouri, Capet Girardeau, Missouri
ENS D. Glynn, Farleigh Dickinson University, Teaneck, N. J.

SEPTEMBER

Dr. J. Abramowitz, Marquette University, Milwaukee, Wisconsin
Dr. H. Wyckoff, American Dental Association, Chicago, Illinois
Dr. R. Bauer, American Dental Association, Chicago, Illinois

STATEMENT OF SIGNIFICANT ACCOMPLISHMENTS

CLINICAL INVESTIGATION DEPARTMENT

(Oral Diseases Division)

The study to evaluate conservative pulp treatment for teeth with deep caries is continuing. During FY 78, an additional 480 naval recruits were screened for "U" (urgent) lesions in which the caries process has penetrated through three-fourths the thickness of dentin but has not advanced to radiographic pulp exposure. Of the 1070 recruits examined in the past two years, 186 individuals (17.4%) presented a total of 314 "U" lesions.

Seventy-four percent of the 314 "U" lesions were treated at Recruit Training Command, Great Lakes, Illinois (RTC). Only 25 of 233 teeth treated at RTC were extracted and 24 others received total or partial pulpectomy. The dental pulps were allowed to remain intact under 80% of the "U" lesions treated. Conservative pulp treatments for these teeth were as follows: complete caries excavation, no exposure, 132; complete excavation, direct pulp cap, 28; indirect pulp cap, 24.

Comprehensive diagnostic and treatment data is compiled for each "U" lesion tooth. The investigators do not influence the clinician's choice of treatment methods. By evaluating radiographs, histories and results of clinical tests at yearly intervals the most reliable procedures and materials for treating pulp disease under deep caries will be determined. Approximately half of the 173 one-year re-call requests mailed have been returned with useful data. Procurement of two-year re-call data has been initiated for the earliest cases.

In the diagnostic phase of this study, 29 specimens have been recovered in a two year period for histologic evaluation and correlation with clinical data of history and diagnostic tests. Work is also progressing to determine the agent(s) and mechanism whereby the dental caries process induces pulp disease. Permeability factor toxin (PF) has been detected in carious dentin extracts. Extracts were prepared of carious dentin collections from teeth undergoing restorative treatment. The PF was solubilized in phosphate-buffered saline and filtered to remove microorganisms. The presence of PF was demonstrated by a rabbit intradermal injection technique. The procedure requires an intravenous injection of Evans Blue dye, followed by intradermal injections of caries extract material and controls of sound dentin extract. The sound dentin extract was prepared in the same manner as the carious dentin extract. Intradermal injections of 0.002 mg. caries extract produced distinct blue-colored wheal reactions within 15 minutes. Injections of sound dentin extracts up to 0.020 mg. resulted in no discernible reaction up to one hour post-injection.

Detection of PF toxin in 0.002 mg. crude caries extract permitted the isolation of the toxin from a 5.0 mg. caries extract sample. Isolation was achieved with three column chromatography procedures: molecular filtration, ion exchange, and hydroxyl apatite adsorption. Injection of the isolated PF toxin into rabbit skin resulted in a more distinct wheal reaction than that produced by crude caries extract.

CLINICAL INVESTIGATION DEPARTMENT (Continued)

Greater quantities of carious dentin extract are now being collected in order to purify the PF toxin on a larger scale. When a sufficient quantity of purified sample is available, the toxin molecule will be characterized chemically and physically. It will then be placed in primate teeth test cavities to determine its role in dental pulp disease.

Captain D. M. Anderson, DC, USN, Director, Clinical Investigation Department, examining a patient during Children's Dental Health Week.

The evaluation of methods for the detection and treatment of incipient carious lesions began with a laboratory study of sixteen dye and light systems. The laboratory studies utilized both white light and ultraviolet on extracted human teeth. The most successful dyes penetrated areas of enamel which exhibited subsurface softening, detected after being sectioned through the stained area. From the sixteen systems evaluated, four (alizarin red-S, 8-hydroxyquinoline, sodium fluorescein, and methyl red) were chosen for clinical trials on 23 subjects, to determine their relative efficacy in the oral environment. As a result of these trials, 2% aqueous sodium fluorescein with ultraviolet light was selected as the most promising detection medium. A one-year clinical trial has commenced to evaluate the sodium fluorescein system. Additionally, a method for treating the disclosed areas with burnished stannous fluoride crystals is also being evaluated. Seventy subjects have been examined. "White spot lesions,"

CLINICAL INVESTIGATION DEPARTMENT (Continued)

areas of ultraviolet light "quenching," and areas of fluroescence have been charted. Those subjects in the experimental group received the burnished stannous fluoride treatment while controls received no experimental treatment. Transillumination of ultraviolet light, as a method of caries detection, was also evaluated and found to be very effective in the anterior region but of little value in the posterior regions due to the broad dimensions of the posterior teeth. Follow-up examinations are scheduled to begin in October 1978 to determine the efficacy of these methods for the detection and treatment of incipient carious lesions.

Forty healthy, young adult male naval recruits were selected for examination on the basis of an intact natural dentition and the absence of any acute oral disease. The examination included scoring for gingival inflammation, bacterial plaque, food impaction, pocket depth, carious lesions, restorations, and overhangs. Of the 1040 areas examined, 841 (80%) exhibited signs of moderate to severe inflammation as evidenced by a tendency to bleed when probed. Additionally 29 of the 40 subjects (73%) had at least one periodontal pocket 4 mm or greater in depth. There was a significant ($P<0.01$), positive relationship between pocket depth and food impaction. Microbiological samples, obtained from 22 of the 40 subjects, were incubated anaerobically on media specific for the Bacteroides fragiles group. None of the samples were positive for this group. In addition to establishing adequate levels of plaque removal by the patient, the clinician should eliminate early in treatment those factors associated with food impaction.

Gold-coated acrylic replicas of periodontal probes were placed in the gingival crevice of right central incisors in 14 adult Rhesus monkeys. The probe was cemented to the tooth and removed in block section for histologic and histometric evaluations. Histologically the gingiva was considered healthy, with only scattered inflammatory cells underlying the crevicular epithelium. The tip of the probe rested within epithelium at or slightly apical to the coronal extent of the junctional epithelium. In healthy gingiva, probe measurements indicated the base of the crevice, but not the level of the connective tissue attachment. Similar block section specimens have been collected from areas of chronically inflamed gingiva and from healing surgically treated areas. These specimens will also be examined to determine the relationship of the periodontal probe to the surrounding hard and soft tissues. These findings will aid in establishing the use of the periodontal probe as a non-invasive method of assessment of the attachment level in the healing dento-gingival junction.

Biopsies of chronically inflamed gingiva were obtained from the premolar area in monkeys. Half the samples were from unwounded areas while the remaining areas had been treated by the flap curettage method five days previously. The biopsies were subjected to biochemical analysis to determine

the rate of collagen synthesis according to the method of Diegelmann, et al., J. Surg. Res., 1975. In both groups 5% of the total protein synthesis was devoted to collagen production.

Standardized gingival wounds of linear incision were evaluated at 0, 2, 7, and 14 days post-operatively in monkeys. At each time the wounds were tested for rupture strength and samples were removed for collagen analysis. Other specimens are being evaluated by histometrics and histology. Evaluation of the healing of this type wound continues.

Periodontal pockets were surgically created in the maxillary anterior area in monkeys. The surgical sites were allowed to heal and the pockets will be used to test the effect of root surface treatment on the formation of a new connective tissue attachment.

Chemical analysis of the cervical root surfaces of extracted human teeth indicated that there were higher levels of calcium, magnesium, phosphorus, and fluoride in diseased areas compared to healthy areas. Values, in micrograms, were as follows:

	Ca	Mg	P	F
Diseased, N=26	154.81	3.96	71.63	1.717
Standard Deviation	35.84	1.01	16.86	1.573
Healthy, N=170	105.31	3.04	49.,17	0.625
Standard Deviation	39.79	1.22	18.59	0.314

The differences in mineral values for healthy and diseased root surfaces were significant ($p<0.001$). Hypermineralization of the root surface is a possible detriment to connective tissue new attachment.

Extracted periodontally involved human teeth were split buccal-lingually and the visible calculus deposits removed. The level of the connective tissue attachment was scribed on each root surface. The diseased root surfaces of the experimental teeth were treated for one minute with a 2% solution of sodium deoxycholate (NaD). The control surfaces were swabbed with sterile saline. The roots were incubated in a culture of human gingival fibroblasts and the number of cells adhering to the diseased root surface counted. The root surfaces treated with NaD had significantly more cells adhering than did the surfaces which were treated with sterile saline. The use of NaD will next be tested in monkeys using the pedicle flap design and chronic periodontal pockets previously created.

A new hemostatic agent, a microfibrillar collagen hemostat (MCH), was tested for usefulness in the free gingival graft procedure. When used on the donor site, it was concluded the MCH was a useful adjunct to this periodontal surgical procedure and aided in patient management.

STATEMENT OF SIGNIFICANT ACCOMPLISHMENTS (Continued)

CLINICAL INVESTIGATION DEPARTMENT (Continued)

(Trauma and Surgical Problems Division)

An evaluation of commercially available dental implants was completed in eight adult monkeys (M. fascicularis). Vitreous carbon devices of an odontoid design, and titanium of a blade vent design, were implanted. Sixteen artificial tooth roots of each type were placed in mandibular bone beneath mucoperiosteum. Implant sites had been prepared by removing all cuspid, bicuspid, first molar and second molar teeth at least 3 months prior to insertion of the devices. At 12 postoperative weeks the implants were surgically exposed to the oral cavity and at 14 postoperative weeks functional crowns were cemented to the alloplastic devices. No splinting of the implants was used. Block specimens were taken from four animals at 26 weeks and from the remaining four at 34 weeks. Ninety-four percent of the titanium and 81% of the vitreous carbon implants remained in position at the end of the study. Although gingivitis was a common finding in areas adjacent to the devices, implant mobility and infection were rare problems. Histological findings were consistent with clinical observations.

A series of short-term experiments were initiated in an attempt to determine why aluminum oxide and acrylic implants failed in a previously completed 39-week study in monkeys. It was found by scanning electron microscopy and dye penetration tests that the devices composed of these two materials were highly porous. All four of the test dyes completely penetrated the aluminum oxide implants. In an evaluation of these materials by a tissue culture method, no evidence of toxicity has been elicited.

A 3-month study was initiated in monkeys for testing implants consisting of aluminum oxide at three different densities and two types of surgical grade metals. Since this study has not been completed, no conclusions can be drawn at this time.

Eight Rhesus monkeys previously used in a tooth transplantation study were subjected to third-set tissue grafts in an attempt to clarify findings associated with second-set skin grafting. Data collection for the 64 skin grafts has been completed and an analysis of the results is in progress.

(Dental Care Delivery Division)

The second phase of a study to determine the most cost-effective utilization of Navy dental technicians and equipment is underway. The performance of operative dentistry utilizing varied numbers of operatories and assistants per dentist was evaluated one year ago. The practice of endodontics using multiple operatories and specially-trained auxiliaries will now be studied. Task areas for endodontic auxiliaries have been identified and training aids are being assembled. Training will be task-oriented, concurrent with usual chairside assistance. When a performance objective for a task has been mastered, the dental technician will be allowed to perform that function in the clinic while progressing to challenge a new task. After the training period, the endodontist's performance with and without specially-trained assistants and multiple operatories will be evaluated.

STATEMENT OF SIGNIFICANT ACCOMPLISHMENTS (Continued)

CLINICAL INVESTIGATION DEPARTMENT (Continued)

Surveillance of the oral health of naval recruits continues. In 1976 there were 44,970 and in 1977, 34,986 naval recruits at Great Lakes. Our sampling is in two phases. First by clusters and then by a table of random numbers. The result is a selection of 0.4% of new servicemen for detailed examination of dental and oral disease prevalence. NDRI now has files on over one thousand sailors for longitudinal and cross-sectional data analysis of incidence of new lesions and dental health management.

The Commander, Recruiting Area Five provided AFQTS and recruiting screen scores on 26 of our recruits who had six month's follow-up data. The recruiting screen score is derived from work of the Naval Health Research Center (NHRC) to predict effectiveness in the first two years of enlistment. There was a significant correlation (p 0.05) of the AFQTS with NPI ($r=-0.425$). Smart recruits keep their teeth cleaner! There were other correlations of great interest, but the small number of subjects precludes final conclusions. The number of decayed surfaces at entry to the Navy and the caries attack rate in first six months were related at $r=-0.343$ level to AFQTS. Demographic data of age, education, and residence have been preliminarily assessed in relation to dental health variables. Recruits who are not high school graduates have more missing teeth. Further work will relate dental health to screen score and performance of naval personnel.

In our studies, an area of interest is to detect those persons of high caries risk, so that they may be singled out for special treatment and preventive measures. Using the caries attack rates (CAR) generated in 1977, recruits were divided into positive and nil rate groups. Significant differences were found for gingival scores, CSI, DT and DS. When the depth of carious lesions was considered, significant differences were found for CSI, DT, MT, DMFT, DS, MS, DMFS. Regression or discriminant analysis will be done on future data output, and composite indices will be tested. Naval recruits with B carious lesions (<1/2 into dentin) have CAR of 1.17%; those with C or U lesions ($\geq$1/2 into dentin) have a CAR of 3.09% ($p=0.05$). The posterior proximal caries attack rates (PPCAR) of these low and high risk groups are 0.37% and 5.66%, respectively ($p=0.05$). It appears that our recruit treatment clinical operations should not only give emphasis to restoring those teeth with C and U lesions, but should also make special SnF_2 treatments to all posterior proximal surfaces in those persons.

The Navy Plaque Control Program is being scrutinized as an instructional system to document its effects, and to revise as required for improvement of effectiveness of learning by naval recruits and for improved delivery by Navy Dental Technicians. To make the plaque control program more cost-effective, we have conducted a performance management analysis of the recruits and the naval dental technicians who present the program. Consultation with an instructional technologist is underway on these target populations to develop plaque control courses specific to the needs of the subjects and those who execute the program. The target population of incoming naval recruits was identified and interviewed. Positive and aversive consequences of the plaque control program as they perceive it were recorded. The dental technician instructors were interview to record a performance

CLINICAL INVESTIGATION DEPARTMMENT (Continued)

discrepancy analysis of current efforts. Pyramids of behavioral objectives were written, together with criterion statements for each. Based on the objectives and all new knowledge, new learning experiences were devised and are being tested.

SCIENTIFIC DEPARTMENT

(Biochemistry Division)

The sticky glucans that the oral organism, Streptococcus mutans, can synthesize from sucrose contain various proportions of α-1, 6- and α-1, 3-glucosidic linkages. These glucans enable the organisms to adhere to tooth surfaces and promote the buildup of dental plaque. One aspect of current research has been a search for sources of enzymes which could degrade the glucans. Such enzymes might be dextranases (α-1, 6-glucanases) or α-1, 3-glucanases. The search for the glucanases was conducted on samples of dental plaque, soil, and organic sludge. Another aim of the studies of dental plaque was to determine whether glucanases may be important oral factors to confer resistance to dental caries.

Interdental plaque samples from 19 caries-free and 20 caries-active recruits were assayed for glucanase-producing organisms. No α-1, 3-glucanase-producing organisms were detectable under the test conditions, but dextranase-producing organisms were present in every subject's plaque. The mean percentages of dextranase-producing organisms out of total organism count did not differ significantly for the two groups of subjects.

Samples of soil and sludge were grown over a 4-month period in a defined medium which contained dextranase-degraded water-insoluble glucan from Strep. mutans ("limit glucan") as the sole carbon source, in an effort to stimulate the preferential growth of α-1, 3-glucanase-producing organisms. The limit glucan had been shown previously by carbon-13 nuclear magnetic resonance to contain more than 90% of the α-1, 3-linkages. Glucanase-producing organisms were detected in about two-thirds of the samples; however, initial efforts to recover the glucanases were not successful since no enzyme activity could be detected through use of standard reducing-power measuring techniques. A much more sensitive method to detect the α-1, 3-glucanases was then developed by complexing the limit glucan with a blue dye (Cibacron Blue). The assay method, in which blue limit glucan is employed as substrate, has been found useful to detect α-1, 3-glucanase-producing organisms in liquid media as well as on agar plates, and also permits determination of the optimal conditions under which the glucanases are elaborated. The method can also be used to monitor the purification of α-1, 3-glucanases and to determine the characteristics of the isolated enzymes. Currently it is being used in further studies of soil and plaque samples.

SCIENTIFIC DEPARTMENT (Continued)

Sufficient quantities of purified polysaccharide from Actinomyces viscosus strain 19246 have also been accumulated, for subsequent use in seeking sources of degradative enzymes for this material.

An investigation of the pH rise-promoting capacities of saliva from caries-free and caries-active recruits has been initiated to determine whether the tetrapeptide, sialin, as well as certain salivary proteins may be significant decay-preventive factors. The identification of such factors could lead eventually to their possible clinical application as preventive measures to reduce the incidence of dental decay. The acquisition of comparative data on the two types of recruits is in progress.

Dr. B. L. Lamberts, Chief, Biochemistry Division explaining various procedures to RADM P. E. Farrell, DC, USN, Chief, Dental Division, BUMED.

The use of fluoride topically, in drinking water and in dentifrices, is the most effective preventive technique currently available; however, little is known of the mechanism of fluoride action and the role that dental plaque may have in its action. Naval recruits with differing caries experience have been examined to investigate the relationship between fluoride in dental plaque and caries incidence. A total of 75 recruits -- 26 caries-free, 14 caries-active, and 35 with low caries incidence -- have had samples of their dental plaque assayed for fluoride content and the ability of the plaque to take up fluoride from 1 p.p.m. aqueous sodium fluoride solution. Variation in the three groups was large and no significant differences could be demonstrated in either total fluoride content, the degree to which the fluoride is bound, or the abiiity of the plaque

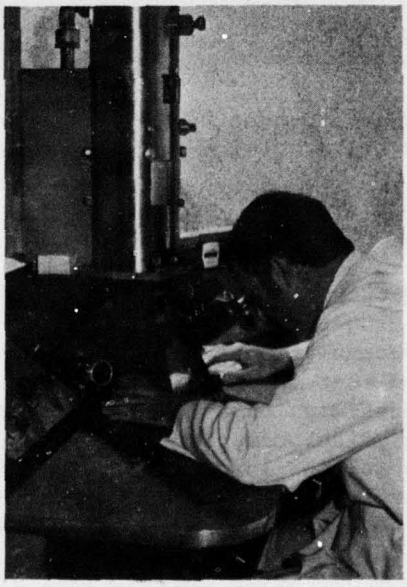
SCIENTIFIC DEPARTMENT (Continued)

to take up fluoride. However, the trends in the observations indicate that caries-free plaque may contain more fluoride, and take up less fluoride from solution, than plaque from caries-active individuals.

The uptake of fluoride from a 1 ppm solution by 10 strains of oral bacteria was also examined to determine if this ability is a general property of plaque organisms or related to selected organisms only. Two Streptococcus sanguis strains concentrated fluoride about 4-fold over the surrounding media, while five Strep. mutans strains and one strain of Actinomyces naeslundii had intracellular concentrations 2-to-3-fold higher than the starting solution. The two strains of Actinomyces viscosus tested showed essentially no fluoride uptake.

(Histopathology Division)

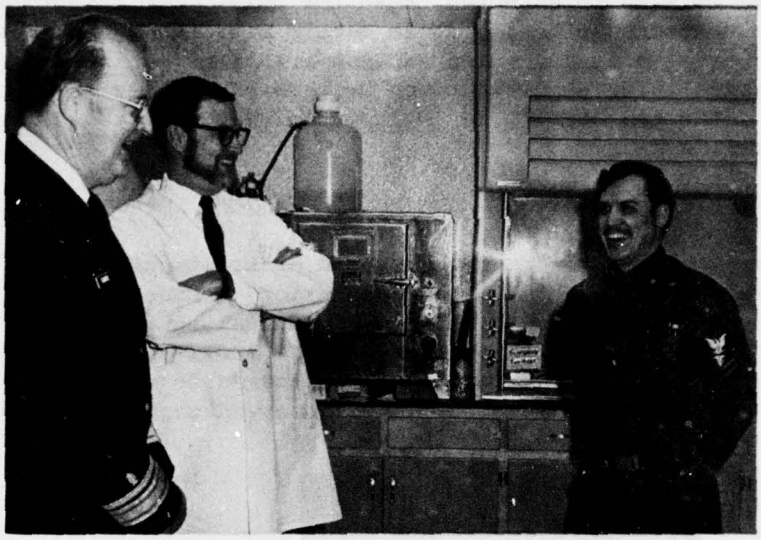
To test the effectiveness of alternative methods of treatment for the arresting or control of periodontal bone destruction, a standardized regimen was developed to induce destructive periodontal bone lesions in a pathogenically-defined animal model system. In the model system, progressive bone loss occurs within a time span of days as compared to months or years in higher animals and in man. To date we have observed that dextranase, a



CDR E. P. Leonard, DC, USN adjusting the electron microscope in the Histopathology Division

SCIENTIFIC DEPARTMENT (Continued)

potential plaque reducing agent, was ineffective in reducing oral bone loss, regardless of the method of delivery (oral swabbing vs continuous administration via drinking water). Dexamethazone, a synthetic steriod with potent anti-inflammatory effects, was also found to be ineffective in the test system.



RADM P. E. Farrell, DC, USN, Chief, Dental Division, BUMED talking with CDR E. P. Leonard, DC, USN and DT1 W. V. Reese in the Histopathology Division.

In FY78 we evaluated the antimicrobial drug chlorhexidine gluconate and found that recipients of this drug displayed significantly less bone loss (as well as less plaque accumulation) than their corresponding controls. Also, it was learned that swabbing of the teeth (versus no swabbing) had a significant beneficial effect. Two diphosphonates were also tested in FY78. One drug, dichloromethylene diphosphonate (Cl_2MDP) showed a significant reduction in bone loss. Two anti-inflammatory drugs were also tested and preliminary results indicate that neither significantly influence the rate of alveolar bone loss in the model system.

(Microbiology Division)

Spriochetes are suspected of playing a role in the initiation and development of acute periodntal diseases. We have begun to study methods for sampling periodontal lesions as well as for the culturing, identification and antibiotic susceptibility testing of oral spirochetes.

STATEMENT OF SIGNIFICANT ACCOMPLISHMENTS (Continued)

SCIENTIFIC DEPARTMENT (Continued)

A sampling device has been developed and tested in clinical trials. This device, which consists of a glass syringe barrel modified to permit the introduction and exhaust of oxygen-free gas, has a blunted needle to permit its insertion into gingival pockets so that specimens may be obtained under conditions of continual anaerobiosis.

Specimens have been obtained from Rhesus monkeys and human volunteers with gingivitis and from two patients and one monkey with necrotiziing gingivitis (Vincent's infection). Spriochetes were cultured successfully from one of the monkeys and from a human patient with gingivitis. Attempts to subculture the monkey isolate were unsuccessful, but the human isolate has been subcultured and identification procedures are underway. Both gas chromatographic identification of culture end-products and biochemical utilization studies are used. Further ssmpling of patients with necrotizing gingivitis is planned and will be conducted as they become available. Antibiotic susceptibility testing of these organisms will be conducted by agar plate dilution. The evaluation of non-antibiotic compounds for spirocheticidal effects will also be investigated.

Although the mechanism of its pathogenicity is not fully understood it has been postualted by others that the presence of the carbohydrate, 6-deoxytalose, (6-DOT) in the organism Actinomyces viscosus may be responsible for the inflammatory reactions noted in periodontal diseases.

Currently A. viscosus has been isolated from three patients classified as having mild gingivitis, four with moderate gingivitis and five with severe periodontal disease. The amount of deoxyhexose per mg of deoxy-ribonucleic acid (DNA) from these organisms are as follows: (a) mild 21.2 ug moles/mg DNA, (b) moderate 21.3 ug moles/mg DNA, and (c) severe 18.9 ug moles/mg DNA. There were no significant statistical differences in the amount of deoxyhexoses/mg DNA from the organisms isolated from the patients with varying degrees of gingivitis.

Specific dextranases have been isolated, tested and evaluated for their oral disease preventive properties. One such dextranase was found to have a high affinity for tooth surfaces and was capable of preventing the adherence of certain cariogenic streptococci onto these surfaces. This enzyme was found to completely prevent dental caries ($p<0.05$) in laboratory hamsters, whereas, a commercial dextranase with a low affinity for hydroxyapatite only caused a non-significant reduction in hamster caries scores. Neither preparation affected alveolar bone loss or dental plaque scores. This data confirms the concept that a dextranase which can strongly adhere to hydroxyapatite can also provide greater protection from dental caries.

The amount of extracellular glucans synthesized by five Streptococcus mutans serotype c strains and their relationship to smooth surface caries activity in rats was determined. The organisms were grown in 5 ml of a

SCIENTIFIC DEPARTMENT (Continued)

chemically defined medium with 5% sucrose and the amount of soluble and insoluble glucans (expressed as ug/ml of glucose equivalents) were determined before animal implantation. The organisms were implanted into weanling antibiotic-treated rats; the animals were then maintained on the cariogenic diet 2000. The animals were killed 60 days after implantation and their caries scores determined by the procedure of Keyes. Strain 1 was classified as a low glucan producer, 120 ug/ml of glucose equivalents; producing about equal amounts of soluble and insoluble glucans. This organism caused a proximal caries score of 4.4 in the rats.

Dr. L. G. Simonson and HM2 D. Jackola are purifying dextranase through molecular filtration in the Microbiology Division.

Strain 2 produced 205 mg/ml of glucan equivalents, all of this was insoluble glucans; the proximal caries score of this organism was 11.5. Strains 3 and 4 produced glucan levels of 326 and 355 ug/ml, with proximal caries scores of 7.1 and 15.4 repsectively. Approximately 85% of the glucans produced by both organisms were insoluble. Strain 5 produced 600 ug/ml of glucans, however only about one-third was insoluble. Strain 5 produced a proximal caries score of 14.75. A trend was noted that the amount of glucans produced by S. mutans, usually insoluble glucans, could be related to proximal caries activity in rats.

An attempt is being made to eliminate or control dental caries in the mouth of naval personnel with a stannous fluoride solution or gel placed on "Super-floss" and applied once to the interproximal space of the teeth. Evidence is available, that in the absence of S. mutans at an

SCIENTIFIC DEPARTMENT (Continued)

interproximal site, no smooth surface lesions develop. If the stannous fluoride treatment eliminates the organism from a particular site, that area automatically becomes less subject to caries attack. There is, however, no hard data indicating the number of S. mutans at a site required to initiate a lesion, although it would appear that the fewer S. mutans present the less likelihood of a lesion developing.

To date fifteen subjects are under study. They have had all their carious lesions restored (Class I condition). Five of the subjects have had a 10 percent stannous fluoride solution applied; six have received a 4 percent stannous fluoride gel treatment and the remaining four subjects have had saline applied as the controls. The 10 percent stannous fluoride solution was found to be difficult to apply and very bitter tasting. As a result, a 4 percent water-free stannous fluoride gel is to be applied to the remaining test subjects.

RADM P. E. Farrell, DC, USN, Chief, Dental Division, BUMED being briefed by Dr. I. L. Shklair, Chief, Microbiology Division during a tour of NDRI.

Preliminary data has shown that the test subjects that had many interproximal sites infected along with high numbers of S. mutans did not respond to the treatment as well as the subjects with fewer S. mutans. If only a few S. mutans were at a site they usually were eliminated for the test period of one year. There was generally a 30-60 percent reduction of sites harboring S. mutans, in all test subjects, one month after treatment. After one month there was a gradual increase in infected sites, however the numbers of S. mutans from the treated sites were often

SCIENTIFIC DEPARTMENT (Continued)

much lower than before treatment. In the very heavily infected patients, the effect of the single stannous fluoride treatment after one month did not appear to reduce the numbers or sites infected with S. mutans. The control subjects did not significantly vary in their percentage of sites infected with S. mutans during the test period of one year.

HONORS, AWARDS, POSITIONS HELD, CEREMONIES, STAFF ARRIVALS, DEPARTURES AND REENLISTMENTS

OCTOBER

CDR E. B. HANCOCK was appointed Assistant Clinical Professor in Periodontics, University of Illinois, College of Dentistry.

Dr. L. G. SIMONSON and Dr. B. L. LAMBERTS received an award for submission of patent to U. S. Patent Office through ONR.

DTCS J. SCHEER received a Letter of Appreciation upon his tranfer to Rota, Spain.

DTC G. R. ELLIOTT assumed the responsibility of Senior Enlisted Advisor as well as being reassigned as NDRI Fiscal & Supply Officer.

DTC P. M. WAGNER reported aboard from the Bureau of Naval Personnel, Washington, D. C. and was assigned to relieve DTC Elliott as CMAA and Chief, Operating Services Division.

DT3 C. N. MICHAEL reported aboard from NRMC Oakland, California. He also received a Meritorious Unit Citation for sea duty in 1976.

The Navy Birthday was celebrated by a Command Inspection, Open House, Dependent's Cruise and dinner.

DTC G. R. ELLIOTT receiving the Navy Achievement Medal from Captain M. R. Wirthlin.

NOVEMBER

R. CROSBIE, GS-4 Supply Clerk resigned.

D. DEICHMUELLER was hired as biological aid in the Microbiology Division.

LT R. J. LINDSAY was promoted to Lieutenant Commander.

LT E. J. MUELLER II reported aboard for duty from Naples, Italy and was promoted to Lieutenant Commander.

JANUARY

DT3 S. HOEFS reported for duty from NRDC San Diego, via NRMC Oakland, California.

MARCH

DTC G. R. ELLIOTT received the Navy Achievement Medal.

DT2 W. F. BRUTON received his second Good Conduct Award.

Ms. M. J. ROUSE was appointed NDRI liaison to NRMC EEO Committee. She was also appointed Federal Women's Program Coordinator of the NRMC Committee.

Ms. D. PINNEO was appointed the 1978 CFC Keyman for NDRI.

DT2 W. F. BRUTON was appointed to Navy Relief Chairman for NDRI.

Captain M. R. Wirthlin presenting DT2 W. F. Bruton with his second Good Conduct Award.

APRIL

DT3 S. HOEFS advanced to DT2, effective 16 April 1978.

DT2 W. V. REESE advanced to DT1, effective 16 April 1978.

AO and CO secretaries were honored at Secretary's Day luncheon.

Dr. I. L. SHKLIAR was re-elected Program Chairman of the Microbiology Section of the International Association for Dental Research and the American Association for Dental Research.

MAY

Dr. B. L. LAMBERTS was appointed President, American Association for Dental Research, Chicago Section.

Dr. B. L. LAMBERTS received a 25 year pin and certificate of government service.

DT1 S. SHELTON III was presented the Navy Commendation Medal for service. He was transferred to Navy Fleet Reserve.

DT2 W. F. BRUTON advanced to DT1, effective 16 May 1978.

DR R. JOHNSON reported aboard from DT Class "A" School, San Diego. California.

DA M. GOLDING reported aboard from DT Class "A" School, San Diego, California.

JUNE

DR R. JOHNSON advanced to DA, effective 1 June 1978.

DT3 J. A. ELLINGSON was presented a Letter of Commendation and was discharged from active duty upon completion of four years of honorable service.

CDR R. G. WALTER was presented a Letter of Appreciation and was transferred to Third FSSG Okinawa.

DT2 M. MINTEN reported for duty from Laboratory Technology, Basic School, NRMC, Oakland, California.

DT2 N. WASDIN reported for duty from Laboratory Technology, Basic School, NRMC, Oakland, California.

JULY

DN E. S. PEPPER advanced to DT3, effective 16 July 1978.

DA M. GOLDING advanced to DN, effective 16 July 1978.

LT L. D. NELSON reported aboard from Twelfth Dental Company, Cherry Point, N. C. and was assiged as Administrative Officer.

LT J. K. PECOTTE reported aboard from Third FSSG Okinawa and was assigned to the Microbiology Division.

LT S. A. LEONE reported aboard from NRMC Oakland, California and was assigned to Trauma and Surgical Problems Division.

DT3 C. N. MICHAEL was presented a Letter of Appreciation and was discharged upon completion of four years of honorable service.

LT H. R. RAWLS was assigned to NDRI for two weeks active duty.

LCDR R. J. LINDSAY was transferred to NRDC, Camp Lejeune, N. C.

AUGUST

LT. S. A. LEONE was nominated Chairman of the Predental Associate Membership Committee for American Student Dental Association.

D. DEICHMUELLER resigned.

ENSIGNS V. MAYO, P. MINKE and L. WOODRUFF of the University of Louisville, Kentucky served a dental clerkship.

MAJOR J. F. GAINES was transferred to NAMRU-3, Cairo, Egypt.

CAPT J. E. YEAGER was transferred to NRMC Camp Pendleton, California.

LCDR J. C. CECIL III reported aboard from School of Public Health, Ann Arbor, Michigan.

Mrs. G. BAILEY volunteered her services and has been assiged to represent NDRI as the Navy Family Ombudsman.

ENS R. SCHWAB of Northwestern University School of Dentistry served a dental clerkship.

SEPTEMBER

HM2 J. CAMACHO was presented a Letter of Appreciation.

CAPT J. R. COOPER (USAF, VC) reported aboard from Brooks AFB, Texas.

Dr. L. G. SIMONSON received a 10 year government service pin.

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) SUMMARIES OF RESEARCH Fiscal Year 1978		5. TYPE OF REPORT & PERIOD COVERED
		6. PERFORMING ORG. REPORT NUMBER NDRI-PR 78-01
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Dental Research Institute Naval Base, Bldg. 1-H Great Lakes, Illinois 60088		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Medical Research & Development Command Bethesda, Maryland 20014		12. REPORT DATE OCTOBER 1978
		13. NUMBER OF PAGES 32
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Bureau of Medicine and Surgery Navy Department Washington, D. C. 20372		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
This document has been approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)
This document has been approved for public release; distribution unlimited.

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Summaries of Research

This report contains

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
Brief summaries of research done from 01 October 1977 through 30 September 1978, including presentations, publications and distinguished visitors.

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